

Appl. No. 10/714,856
Supplemental Amendment dated: February 21, 2008
Reply to OA of: September 25, 2007

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1(original). A titanium dioxide film synthesizing method comprising the steps of: coating a titanium film on a surface of a substrate, and placing the titanium-coated substrate as anode in an electrolyte to synthesize an anatase phase of titanium dioxide film on a surface of said titanium film by employing electrochemical anodic oxidation.

2(previously presented). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said substrate is selected from the group of materials selected from the group consisting of titanium, glass, ceramics, polymers, and a semiconductor.

3(previously presented). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said titanium dioxide film is nano-granular-structured.

4(original). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said titanium film is deposited on said substrate by sputtering.

5(original). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said titanium film is deposited on said substrate by evaporation.

6(original). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said electrolyte is a highly alkaline solution containing alkaline metal ions.

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7(original). The titanium dioxide film synthesizing method as claimed in claim 6, wherein said electrolyte is selected from one of potassium hydroxide (KOH) and sodium hydroxide (NaOH).

8(original). The titanium dioxide film synthesizing method as claimed in claim 1, wherein the concentration of said electrolyte is within 0.1~10 M.

9(original). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said electrochemical anodic oxidation is performed by using a potentiodynamic mode at voltage ranging from 30 V to 75 V.

10(original). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said electrochemical anodic oxidation is performed by using a scanning electrolytic voltage mode at a scanning rate below 200 mV/s and a scanning cutoff voltage within 3 V to 85 V.

11(original). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said electrochemical anodic oxidation is performed for a period of time within 5 minutes to 10 hours.

12(original). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said electrochemical anodic oxidation is performed at a working temperature within 15°C~90°C.

13(original). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said electrolyte is highly acid solution such as sulfuric acid (H₂SO₄).

14(original). The titanium dioxide film synthesizing method as claimed in claim 1, further comprising the step of heating said anatase phase titanium dioxide film under

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atmospheric pressure for a predetermined length of time to transform said anatase phase titanium dioxide film to rutile phase titanium dioxide film.

Claims 15-20(canceled).

21(previously presented). The titanium dioxide film synthesizing method as claimed in claim 1, wherein said substrate is a silicon wafer, said titanium film is deposited on said substrate by sputtering, said electrolyte is a highly alkaline solution containing alkaline metal ions, and wherein said electrochemical anodic oxidation is performed by using a scanning electrolytic voltage mode at a scanning rate below 200 mV/s and a scanning cutoff voltage within 3 V to 85 V.

22(new). The titanium dioxide film synthesizing method as claimed in claim 14, wherein said anatase phase titanium dioxide film is heated at 500°C for 2 hours.